REMARKS/ARGUMENTS

Claims 1-10 and 17-26 are resubmitted. Claims 1-7, 17, and 26 are currently amended. Claims 11-16 are canceled without prejudice or disclaimer. No new claims have been added.

Claims 11-16, subject to election/restriction, have been requested to be canceled. Claims 17-26 have been rejected under 35 USC §112, second paragraph. Claims 1-10 and 17-26 have been rejected under 35 USC §101. Claims 1-8, 17-23, and 26 have been rejected under 35 USC §102(b) as being anticipated by Padula et al., "Multidisciplinary Optimization Branch Experience Using iSIGHT Software," National Aeronautics and Space Administration Report TM-1999-209714, pp. 1-19 (November 1999) ("Padula"). Claims 9-10 and 24-25 have been rejected under 35 USC §103(a) as being unpatentable over Padula in view of Amundsen et al., "Preliminary Thermal Analysis of a Mars Sample Return Earth Entry Vehicle," American Institute of Aeronautics and Astronautics, AIAA-2000-2584, pp. 1-10 (2000) ("Amundsen").

Support for the amendments to the claims may be found, for example, in Figures 2, 4, and 5 and in the specification as filed, for example, at paragraph **[0028]** (automated process); paragraphs **[0030-31]** (computer hardware); paragraph **[0034]** (multidisciplinary reusable component with global inputs and global outputs); and paragraph **[0040]** (integrating and interfacing multi-disciplinary module).

Election/Restriction

Election of claims 1-10 and 17-26 without traverse on 31 January 2005 is affirmed. Claims 11-16 are canceled without prejudice or disclaimer of the subject matter.

Examiner Interview

A telephonic interview was conducted between the Examiner and Applicant's representative. The rejections under 35 USC 112 and 101 were discussed. The Examiner indicated that the proposed amendment to the claims should overcome these rejections. The Examiner indicated that an updated search will be required to determine if the proposed amendment distinguishes the prior art references Padula and Amundsen. No other agreement was reached.

Rejections - 35 USC § 112, second paragraph

Claims 17-26 have been rejected under 35 USC §112, second paragraph as being incomplete for omitting essential elements. The rejections have been addressed by amending claims 17 and 26 to include a computer system. Support for the amendments to claims 17-26 can be found in the specification, for example, at paragraphs **[0030-31]**, paragraph **[0034]**, and Figures 2A and 2B. Accordingly, it is respectfully submitted that the rejections under 35 USC § 112, second paragraph should be withdrawn.

Rejections - 35 USC § 101

Claims 1-10 and 17-26 have been rejected under 35 USC §101. The Office action asserts that in claims 1-10 the method steps appear achievable by a person using mental steps or pencil and paper. Claims 1-10, and more particularly, claims 1-2 and 6-7 have been amended to more clearly recite that an automated method, as disclosed by the specification as filed, is being claimed for producing a concrete, useful, and tangible result, for example, an optimized thermal protection system design. The massive amount of module

processing performed by computer along with the complicated interaction and intercommunication between modules required by the method and also performed by computer while the massive amount of processing required by the modules is being carried out (as claimed by amended claim 1) could not possibly be achieved by a person using mental steps or pencil and paper or even by a team of people working together in any reasonably practical length of time. Thus, it is believed that claims 1-10 are directed to statutory subject matter as disclosed by the specification and that the § 101 rejection to claims 1-10 should be withdrawn.

System claims 17-26 have been rejected for reciting a machine that appears to be implemented in software alone. Claims 17-26 have been amended to include recitation of computer hardware that executes the software of the modules, as supported by the specification as filed, for example, at paragraphs **[0030-31]** and **[0034]**, thus claiming a tangible apparatus. Therefore, it is believed that the § 101 rejection to claims 17-26 should be withdrawn.

Padula et al.

Claims 1-8, 17-23, and 26 have been rejected under 35 USC §102(b) as being anticipated by Padula.

Although Applicant may agree with the Office action that Padula discloses use of the iSIGHT software tool for single-disciplinary analyses and optimizations and for connecting several simulation codes together without changing any of the codes (Padula, p. 6, paragraph 2), Applicant submits that iSIGHT is a software tool (such as, for example, Microsoft Office®) that can be used to implement and verify the methods and procedures of the present invention that were developed for optimal thermal protection system design, but

which is not necessary to realize the present invention as claimed by the (amended) claims. Padula does not suggest the interfacing of single-disciplinary modules that provides integration into the multi-disciplinary module as claimed and, in fact, refers to "fine tuning" and "experimentation" (Padula, p. 4, paragraph 3) to optimize a complicated multi-disciplinary analysis task. Moreover, while Padula may disclose that iSIGHT allows optimization experts to develop optimization methods that the disciplinary experts can use and modify (Padula, p. 9, paragraph 3), these experts are performing different functions at a different stage of analysis that achieve different results from the functions performed by the chief engineer and single-disciplinary engineers that are providing single-disciplinary and global inputs to the multi-disciplinary module as claimed, for example, by amended claim 1. Nor does Padula provide any hint of creating a system level, multi-disciplinary reusable component to embody system level problem definition or interact with a chief engineer as claimed by the currently amended claims. Neither does Padula suggest the multi-disciplinary reusable component, as in the present invention, that interacts with the multi-disciplinary module via global inputs and outputs during computer execution of the multi-disciplinary module and allows interaction with the chief engineer during computer execution of the multi-disciplinary module.

Therefore, Applicant submits that Padula does not anticipate the present invention (as claimed by the amended claims), but rather merely presents some examples of the use of a software tool that may be used in various ways different from the present invention to achieve alternative results from those of the present invention.

Amundsen et al.

Claims 9-10 and 24-25 have been rejected under 35 USC §103(a) as being unpatentable over Padula in view of Amundsen.

While Amundsen may deal with thermal protection issues, and may divide a thermal analysis into four phases, the four phases are merely single-disciplinary thermal analyses at successive periods in time and do not represent a true multi-disciplinary analysis. Thus, even if combined with the multi-disciplinary analysis of Padula, there is still no motivation nor suggestion to provide an automated, system level multi-disciplinary reusable component that would embody system level problem definition during computer execution of a multi-disciplinary module; there is still no motivation nor suggestion to provide an automated, system level multi-disciplinary reusable component that would provide and receive global inputs and outputs for a multi-disciplinary module during computer execution of the multi-disciplinary module; and there is still no motivation nor suggestion to provide an automated, system level multi-disciplinary reusable component that would interact with a chief engineer during computer execution of a system optimization process performed by the multi-disciplinary module as in the present invention claimed by the currently amended claims.

Therefore, Applicant submits that Padula in view of Amundsen does not render obvious the present invention (as claimed by the amended claims), and that the obviousness and anticipation rejections should be withdrawn.

Prior art made of record and not relied upon

Parson (U.S. Patent 6,053,947) merely shows that a concept of "wrappers" is known in the art for use of software tools but makes no suggestion that can be combined with any other prior art to achieve the integrated multi-disciplinary methods of optimization as claimed by the present invention.

Chen et al., "Integrated Electrical and Thermal Analysis of Integrated

Power Electronics Modules Using iSIGHT," 16th Annual IEEE Applied Power Electronics Conference and Exposition, Vol. 2, pp. 1002-1006 (March 2001) ("Chen") presents an analysis of thermal issues generated from power electronics. Chen's power electronics system is a completely different system compared with thermal protection systems (TPS) that protect space reentry vehicles from penetration of aero-heat generated from the friction of air on a reentry vehicle during high speed flight. As such there is no suggestion applicable to multi-disciplinary optimization for thermal protection systems

Korte, "Parametric Model of an Aerospike Rocket Engine," American Institute of Aeronautics and Astronautics, AIAA-2000-1044, pp. 1-9 (2000) ("Korte") merely presents an aerospace vehicle aerospike rocket engine design that is not applicable to multi-disciplinary optimization for thermal protection systems.

CONCLUSION

Applicants would like to thank the Examiner for the telephone interview of May 4, 2005. Reconsideration and withdrawal of the Office Action with respect to claims 1-10 and 17-26 is requested. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

In the event the examiner wishes to discuss any aspect of this response, please contact the attorney at the telephone number identified below.

Respectfully submitted,

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on May 9, 2005

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